PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements relating to Free-Wheel Mechanism

I, ANTON FLETTNER, a German citizen, of Nürnbergerstrasse 53/55, Berlin, W.50, Germany, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to locking ball or roller free-wheel mechanism of the kind which drives and allows the driven member to over-run in both directions of rotation.

The present invention provides improved mechanism, which is particularly suitable for use in driving the lighting dynamos of railway vehicles. Hitherto such dynamos have commonly been driven from the wheel axles of the vehicles by driving belts without the interposition of any free-wheel or shock absorbing means, so that the belts are subjected to unusual strain when the vehicles are braked. It has been proposed to employ slipping belts and the like, but even with such arrangements the destructive forces set up in braking cannot be entirely prevented.

According to the invention, locking ball or roller free-wheel mechanism of the kind referred to has brake means rendered non-rotatable (for example by connection with the dynamo casing) and yieldingly held by spring means in contact with the ball or roller cage to exert thereon a continuous frictional or braking restraint and thereby effect automatic control enabling the driven member to over-run the driving member in either direction of rotation.

Means may be provided enabling adjustment of the degree of frictional restraint effected by the engagement of the non-rotatable member with the cake.

In the accompanying drawing, Figs. 1 and 2 represent a typical embodiment of the invention as applied to a belt-driven dynamo for lighting a railway carriage and

Figs. 3 and 4 represent modifications.

The dynamo casing 10 carries a bearing 11 for the dynamo shaft 12. Secured on the dynamo shaft 12 is a driver 13 which also comprises the outer race for free-wheel rollers 14, 15. A belt pulley 16 is rotatably mounted about the dynamo shaft 12, and its interior portion 17 forms the inner roller race. The surfaces of the inner race 17 are tangential plane surfaces (see Fig. 2). Their disposition is symmetrical, and the free-wheel rollers 14, 15 encounter the same locking conditions in either direction. The free-wheel rollers 14, 15 are guided by a cage 18 which, in turn, revolves on a shaft 19. The latter supports a hub cap 20 on the pulley 16 by means of ball bearings 21, 22 and is secured to the dynamo casing 10 by an arm 23 so that it cannot rotate in relation to said casing. The arm 23 might also be secured to the railway carriage itself, and thus prevent the shaft 19 from turning in relation to the carriage. A spring-controlled brake plate 24 slidably keyed on the shaft 19 is pressed against the hub of the roller cage 18 and exerts a slight braking effort, with regard to its rotation on the fixed shaft 19.

The spring may be disposed so that its pressure can be adjusted.

The roller cage 18 moves in relation to the belt pulley 16 in slots or holes 25, 26 provided in the web of the latter. The frictional engagement of the brake plate 24 with the roller cage 18 exerts a continuous retarding torque on the latter and thereby ensures the functioning of the rollers in the desired manner in both directions of rotation.

Complete free-wheeling may not be allowed, the free-wheeling member being slightly braked, for example in order to enable the dynamo armature, rotating with slight momentum, to be brought to a standstill when the railway carriage is being shunted. With this object a spring-controlled brake plate 27 is mounted on the dynamo shaft 12 and bears lightly against the belt pulley 16, so that the free-wheeling of the armature, or the shaft 12, in relation to the belt pulley is lightly checked.

Fig. 3 shows an arrangement in which the inner roller race 28 which is the driven member is cylindrical, whereas the outer race 29 constituting the driving member is provided with surfaces disposed at an angle in relation to the inner wall, thereby enabling the rollers to be locked.

Fig. 4 shows an arrangement in which

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two groups of rollers are provided. The one group, namely, the rollers 30, 31, 32 and 33, lock in one direction of rotation, whilst the rollers 34, 35, 36 and 37 lock in the other direction of rotation. Both groups of rollers are guided in the same cage 38. In this case also, the cage is rotatably mounted on a fixed shaft, in a manner similar to that for the cage 18 in Fig. 1, and is lightly braked in relation thereto.

The spring pressure on the brake plate 24 and/or that on the brake plate 27 may be adjustable.

It may be again pointed out that undesired locking of the free-wheel rollers, during the forward or backward running of the railway carriages, is prevented by the light braking or retardation of the rotation of the roller cage.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A locking ball or roller free wheel mechanism of the kind referred to, particularly for use in driving the lighting dynamos of railway vehicles, having brake means rendered non-rotatable (for example by connection with the dynamo casing) and yieldingly held by spring means in contact with the ball or roller cage to exert thereon a continuous frictional or braking restrain and thereby effect automatic control enabling the driven member to over-run the driving member in either direction of rotation.

2. Free-wheel mechanism according to claim 1, wherein the degree of frictional restraint effected by the engagement of the non-rotatable member with the cage is adjustable.

3. Free-wheel mechanism according to claim 1 or 2, wherein the non-rotatable member is constituted by a spring-controlled plate, ring or the like.

4. Free-wheel mechanism according to any of claims 1 to 3, in combination with a dynamo, a fixed bearing member being supported firmly, as by an arm, upon the dynamo casing and mounting the non-rotating member and an anti-friction bearing for a belt pulley.

5. Free-wheel mechanism according to any of the preceding claims, having brake means to restrain the over-running of the driven member when freed from driving torque by the mechanism.

6. A locking ball or roller free-wheel mechanism substantially as described with reference to the accompanying drawings.

Dated this 7th day of May, 1934.

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Fig. 1

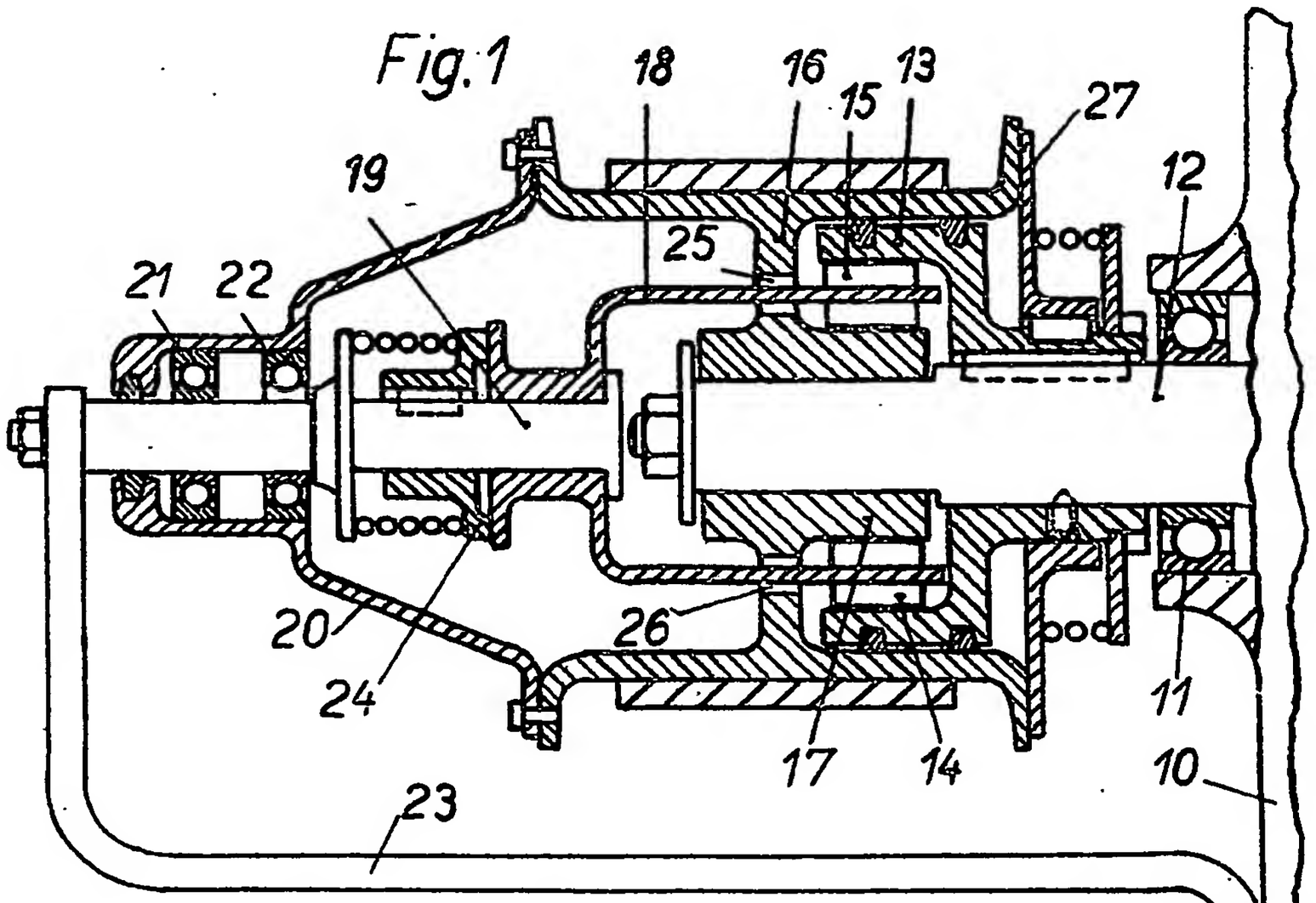


Fig. 2

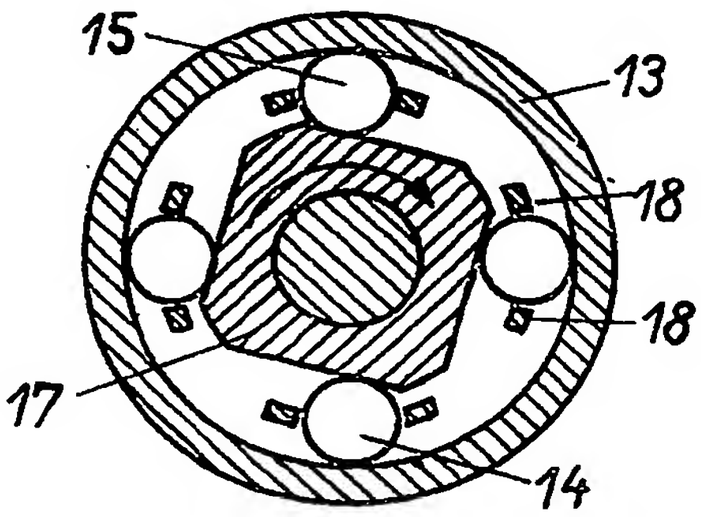
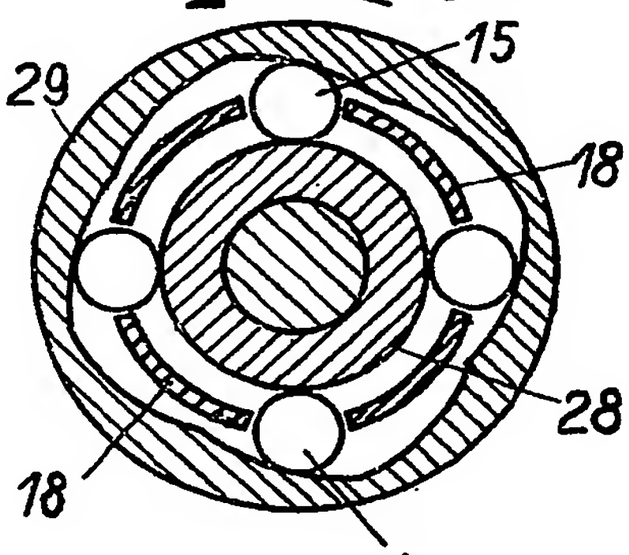


Fig. 3



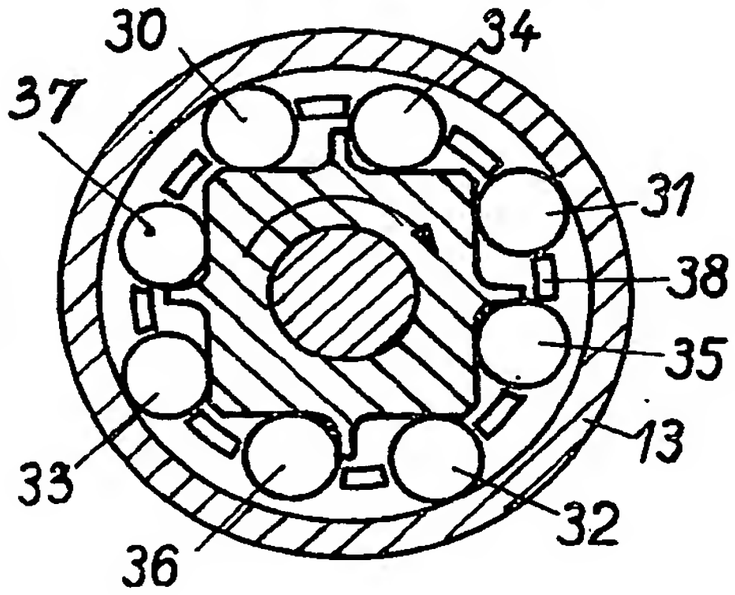


Fig. 4

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